Small Business Innovation Research/Small Business Tech Transfer

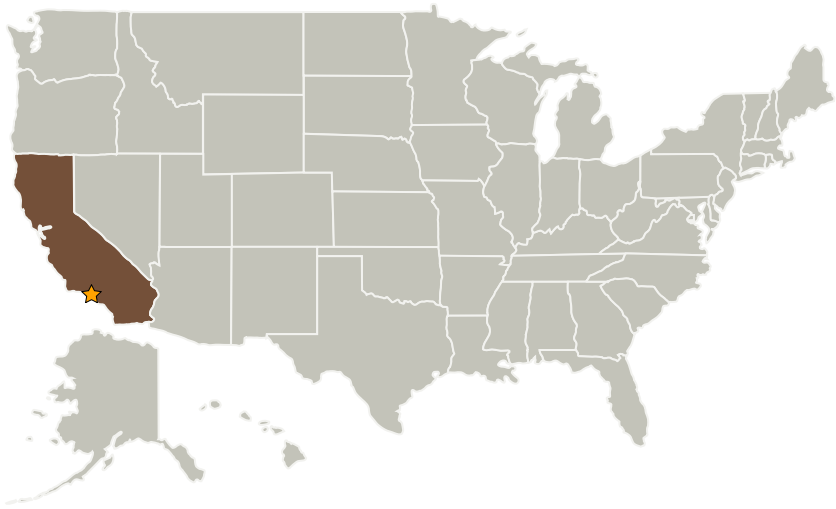
Light Weight Low Force Rotary Percussive Coring Tool for Planetary Applications, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

Current science for Mars and lunar exploration demands that fairly small diameter intact rock cores be acquired for geologic evaluation. Tools to acquire these cores must be light weight, draw minimal power, and induce low loads on their robotic platforms. Unfortunately no tools have yet been produced that meet these requirements and produce a viable core. Alliance Spacesystems, LLC produced a rotary percussive drill designed for space use under a NASA-funded Mars Instrument Development Program (MIDP) project -- the Low-force Sample Acquisition System (LSAS) -- that successfully drilled and acquired samples from a variety of rocks and soils including the hardest anticipated Martian rock (basalt) and frozen soil not only in ambient conditions but also in a thermal/vacuum chamber replicating Mars pressure and extreme temperatures. Alliance now proposes to adapt the design approach to rock coring, using the demonstrated performance and advantages of rotary percussive drilling to solve the problems currently being encountered with the state of the art coring approaches.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Alliance Spacesystems, LLC	Supporting Organization	Industry	Pasadena, California

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

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Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.2 Mobility
    - TX04.2.2 Above-Surface Mobility